"still water" of the river Tees is tenanted by a form of *Buccinum undatum* as light and thin as most of the specimens I procure from the depths of the *Coral zone.*

The most obvious difference between the Tees shell and *pelagicum* consists in this, that in the latter the spire is "very long" in consequence of the whorls slowly increasing in diameter; while it is remarkably short in the former, owing to the rapid augmentation of the whorls. It is singular, while *Buccinum undatum* decreases in tumidness in proportion as its depth of habitat increases, that the two species, *Fusus antiquus* and *F. islandicus,* should, on the contrary, become more and more ventricose.

It affords me much pleasure, before concluding the present notes, to mention, that I have lately procured a young specimen of *Buccinum ovum,* Turton (vide Zoological Journal, vol. ii. p. 366. pl. 13. fig. 9). It was brought up by the fishing lines off the coast of Northumberland, from soft ground, in the *Coral zone.* The specimen is half an inch long, and has four whorls, the first two of which have a truncated form: the shell is white, faintly spirally striated and covered with a greenish epidermis. Considering the numerous varieties existing of *Buccinum undatum,* it would not surprise me, if the crag fossil *B. Dalei,* Sowerby, should prove to be the same species: the principal difference between them seems to be in the latter being more strongly spirally striated. Mr. Morris, however, informs me, that the striation of *B. Dalei* is a variable character, which is proved by some unpublished figures of this species that he has kindly favoured me with. An examination of more specimens, than I possess, of both forms is necessary, however, before deciding as to their specific identity. Probably, the ordinary specimens of *B. Dalei* lived in the Coralline zone, which will account for their being thicker than those of *B. ovum,* judging of my specimen, and the one figured by Dr. Turton. In both forms, the termination of the left side of the canal is slightly tongue-shaped.

BIBLIOGRAPHICAL NOTICES.

Outlines of Structural and Physiological Botany. By ARTHUR HENFREY, F.L.S. &c. 12mo. Van Voorst, 1847. Pp. 245, 18 plates.

MUCH has been done of late years in this country to aid students in the prosecution of botany. The valuable Introductions of Lindley and Gray are now in the hands of all, and when combined with Babington's excellent 'Manual' they form a complete text-book for the British botanist. Nevertheless we hail the appearance of Mr. Henfrey's work as one which has been ably executed, and in a manner somewhat different from that adopted by the other authors alluded to. The "Outlines" are confined entirely to *structural* and *physiological* botany without reference to classification. They contain many interesting original observations, and they give a condensed view of the state of botanical knowledge at the present time, to the exclusion of all theories which have been abandoned or advanced without sufficient grounds. The book is thus confined within a moderate compass, and the student is at once put in possession of the great leading facts of the subject unencumbered with the statement of numerous opinions.

The author commences with a consideration of the chemical constituents of vegetables, and then proceeds to the elementary structure, or the cells and vessels of plants and their functions. His remarks on cytogenesis are well worthy of attention. There are three theories of cell-development which he considers worthy of notice:—

"1. The formation of free cells from nuclei, in the cavity of the parent-cell: this view was proposed by Schleiden.

"2. The formation of new cells by the division of the mucilaginous investment of the interior of the cell (primordial utricle) into two or four perfect, closed sacs, *around* and *by* the whole outer surface of which a new layer of membrane is simultaneously formed for each portion, these constituting the new cells. This is the theory of Nägeli.

"3. The gradual division of the primordial utricle into two portions by an annular constriction and infolding, the fold growing inward to the centre, and a layer of permanent cell-membrane being also deposited by each lamella of the fold, gradually from the circumference to the centre. This view was advocated by myself as the *universal* mode of cell-formation, in a paper read before the British Association at Cambridge last year, and has been more fully developed in a recent memoir by Mohl."

In speaking of the functions of what have been called *milk-vessels* he says, "They may be regarded as intercellular passages containing peculiar secretions not essential to the *life* of the plant. The pretended circulation of the latex was a groundless hypothesis and arose from erroneous observation." He thus differs completely from Schultz, and believes with Mohl, that the gravitation of the fluids when the vessels are cut is the cause of the motions observed. In treating of the mode in which woody matter is formed, he seems to discard the theories of Petit Thouars and Gaudichaud as reared on erroneous foundations. At p. 54 he remarks, "Each vascular bundle (of a monocotyledonous stem) originates at the point where the new leaf or phyton is developed out of the nucleus of cellular tissue at the apex in the centre, and is gradually elongated into an ascending portion which passes upward into the petiole, and into a descending portion which passes outward and downward a little above the ascending bundle of the leaf below. It must not be imagined however that the *descending fibres break through* the cellular tissue; no interruption of continuity takes place within the stem; the vascular bundle is formed out of cells *in the place where it is subsequently found,* in consequence of the law of development of the plant. We say that the fibres *descend*, because the middle portion is that which first becomes distinctly developed into a vascular structure."

When considering the physiology of vegetation, the author alludes to the function of spiral vessels, and differs from those who look upon these vessels as formed for the special purpose of conveying air. In their earlier developing condition they are full of fluid, and "it appears probable," he says, "that their office, like that of the other vascular and fibrous tissue, is to give strength to the parenchyma, and they are peculiarly adapted to the requirements of the tissue in which they are found. Their structure is that which gives the greatest strength and elasticity consistent with lightness. This is a sufficient explanation of their predominance in those parts where the tissue is most delicate and the growth most rapid. The medullary sheath is of course, in this view, regarded as adapted peculiarly to the early, developing condition of the pith."

The process of respiration and assimilation in plants, according to the author, "consists of the production of a proteine compound, by the agency of light, from the crude juice consisting of water holding in solution carbonic acid and ammonia. When the light is freely admitted to act, as is the case in the usual condition of plants, the assimilating process preponderates in activity over the developing power, and the excess of nutriment not being required for immediate use is deposited as starch instead of cellulose; the deoxidating process still continuing, this starch, also receiving in the process a small quantity of nitrogen, becomes chlorophylle. Should the light be intercepted now, we shall have a retrogressive series of processes; the chlorophylle will disappear, since the respiration is reduced to such a low degree that all the carbon is required for development; the plant continues to grow for a time, its tissues weak and succulent, till all the assimilated carbon having been consumed in the production of new structures, the plant dies of starvation."

The consideration of the reproductive organs and their functions necessarily occupies a large portion of the work, and the morphological views of structure are brought forward in a lucid and interesting manner. After stating the opinions relative to marginal and axile placentation, he concludes thus :—

"As the question stands at present, we are led to prefer the theory of carpellary placentation by the evidence afforded by the *parietal* form as occurring in Violaceæ, Papaveraceæ, Orobanchaceæ; the *axile* placentas of Scrophulariaceæ, Ericaceæ, &c. appear to admit of an explanation by both views, as do also the *central* placentas of Caryophyllaceæ. The central placenta of Primulaceæ and Santalaceæ favours the idea that the placenta is a prolongation of the axis, and can only be explained by the carpellary hypothesis, by supposing that the central placental column is a *confluent whorl of placental processes developed separately from the carpels through a process of deduplication.*"

The obscure subject of fertilization receives considerable attention, but the author confesses that he is as yet unable to come to any definite conclusion on the point. The important facts however, so far as they are known, are well stated.

The work concludes with remarks on physiological phænomena of a general nature, including the colour, light, and motions of plants.

The plates are from drawings by the author, and they are executed in a clear and correct manner.

We have no hesitation in recommending this work to the attention of all students of botanical science. The conciseness and clearness of the descriptions, the accuracy of the views, and the philosophical spirit which pervades the whole work, deservedly place it in a high rank among the elementary botanical treatises of the present day.

Supplement to English Botany.

It is long since we have called attention to this valuable and most beautiful work, and therefore now repeat our earnest call upon all our botanical readers to extend their patronage to it. We do this the more earnestly because we know that it is in great want of that support which it has so good a right to expect, for at the present time "the sale barely repays the money expended upon print and paper, the proprietor being himself the artist and engraver." From this cause much irregularity has attended its publication, but it is now the intention of Mr. J. W. Salter, the son-in-law of Mr. Sowerby, who has undertaken its management, to issue it regularly on the first of every third month, with six plates in each number instead of four.

Mr. Salter states that he is "favoured with the support and encouragement of those distinguished botanists whose assistance has conferred so much value upon the work," and that "he has every reason to hope that the descriptive part of future numbers will not be inferior to that which has already appeared." We feel confident that such will be the case, and may add concerning the plates, that no better, even if equally good, representations of plants are to be found in any work of science or art. The drawings and engravings will be made by Mr. Sowerby and Mr. Salter, the persons from whose hands the illustrations in former numbers have proceeded.

We have now before us two numbers published since the issue of the prospectus from which we quote, and can safely state that they are fully equal to their predecessors; they are numbered 68 and 69, being 12 and 13 of the new series, no part of which will be included in the "small edition" lately issued by the proprietors of the original work. Amongst the plants figured in them are *Lamium intermedium*, *Hieracium Lapeyrousii*, *Statice rariflora*, beautiful plates both botanically and artistically; also *Poa Parnellii* and *P. Balfourii*, new grasses which are well represented; and in addition several interesting cryptogamic plants.

When we remember the very numerous copies which have been purchased of the original work and the "small edition," it is unaccountable to us that this supplement (an essential appendage to either of them) has obtained so little support.